REENGINEERING OF CHINESE CONSTRUCTION CORPORATION BASED ON BILL OF QUANTITIES

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ABSTRACT

The promulgation of *The Code of Valuation with Bill of Quantities of Construction Works* has resulted in a transformation and revolution in China construction industry. It's essential and crucial to perform BPR (Business Process Reengineering) for Chinese construction corporations to succeed, even survive. Managers must fundamentally rethink and radically redesign the structures of their organizations as well as the operating processes according to this new environment. As a key process among various processes in a construction corporation, a case of construction project procurement process reengineering is illustrated detailedly in this paper.

Keywords: bill of quantities, reengineering, construction, procurement

1. INTRODUCTION

Ministry of Construction of the People's Republic of China promulgated *The Code of Valuation with Bill of Quantities of Construction Works* on July 1st, 2003. This code has given birth to a revolution in the history of China construction industry and indicated the transformation from the traditional mode of rating valuation, in which engineering cost and quantities are indistinguishable from each other, to the modern mode of Bill of Quantities (BQ) valuation which is market-oriented. Since then, the bidding system of China construction industry begins to keep consistent with international tradition.

Now contractors in construction industry are facing a new operating system in which engineering cost depends on market instead of the traditional ratings which are given and totally controlled by the government. However, antique and outdated operating structures, as well as management system, of lots of Chinese construction corporations are lack international competition, creative spirit, while they should be lean, nimble, flexible, competitive, innovative, efficient, owner-faced, and profitable. It's urgent to reform according to the market and keep on continuous development for construction corporations of China.

Facing the situation, business process reengineering, a brand-new vision of how construction corporations should be organized and managed if they wants to succeed— indeed even survive, is advocated in this paper.

2. THE ESSENCIAL OF BPR

Without redesign and reengineering, it should come as no surprise that Chinese construction corporations will lose much competitive advantage against foreign contractors after China's thorough opening to overseas construction industry. There are three main reasons why BPR should be performed in Chinese construction corporations.

- Competition intensifies after *The Code*'s promulgation

  BQ mode shows out the function of market. It drives construction corporations forward to enhance their core competence and form their competitive advantage against each other. The one who is low-efficient and non-competitive will be abandoned and deserted. Since Chinese corporations fall behind foreign contractors in aspect of labor productivity, technology, management and marginal profit in general, without innovation of organization, management, and technology, they cannot survive, nor bear down or defeat foreign participators. They have no choice but to reengineer themselves.

- Very many Chinese corporations are lack of internal ratings

  Many Chinese construction corporations still use the method of rating valuation in practice operation, which indicates that they attach little importance to the method of BQ valuation. It's common that the employees who take charge of engineering cost are familiar with the old mode but cannot work with BQ mode because of the limit to management and technology level. As a result, the corporations are lack of ratings of their own. This state is a symptom that there is something wrong in operating system and managers even don't know their own productivity.

- Chinese construction industry drops behind foreigners in the R&D of information technology

  Foreign contractors keep ahead in taking advantage of computer science and information technology. In China, only a little portion of projects conducted by Chinese corporations have used Project Management Information System (PMIS), not even Information Portal (IP) and Lifecycle Information Integration (LII).

In conclusion, Chinese construction corporations' business problem is that it is entering a new times with organizations designed during the twentieth century to work well before joining WTO. Something entirely different is needed—that is BPR.

3. CORE IDEAS OF BPR

BPR is about rejecting the conventional wisdom and received assumptions of the past. It means starting over.

Michael Hammer, originator of BPR, has given a formal definition as follows: "Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed. "

3.1 Process orientation

Construction corporations today consist of functional silos, or stovepipes, vertical structures built on narrow pieces of processes. Work is too often thin sliced into meaningless tasks. And power and responsibility is usually diffused through massive bureaucracies. No one in the organization oversees the whole process and its result, no one person is responsible for it. BPR emphasizes a change that modern corporations must organize work around process.

At the heart of this change lies the notion of discontinuous thinking—identifying and abandoning the outdated thoughts that focus only on single task, single project, single department, and single organization. Since an organization consists of various processes, it should get structured not only on the viewpoint of function and profession, but also on the viewpoint of process. A process-oriented organization should not be pyramidal, but be flat in order to suit with the horizontal information flows.

3.2 Owner focus

BPR aims at the achievement of owner value. In construction industry, the outputs of primary processes should add value for owner. The value should be the one which owner can recognize and reward. All activities should be carried out around this purpose. Owner value is also a reason why construction projects exist.

3.3 Work units process teams

BPR puts back together again the work broken into tiny pieces so many years ago. Once a corporation is restructured, process teams groups of people working together to perform an entire process turn out to be the logical way to organize the people who perform work. Process teams don't contain representatives from all the functional departments involved. Rather, process teams replace the old departmental structure.

3.4 Value Chain

Value Chain helps to identify and map processes and to decide which ones require reengineering and the order in which they should be tackled. This concept was brought forward by Michael Porter. He Figures out that there are two kinds of operational activities: primary value adding activities and assistant activities.

So there must be a primary chain inside an organization. Look at Figure 1. It is a construction corporation's internal value chain.

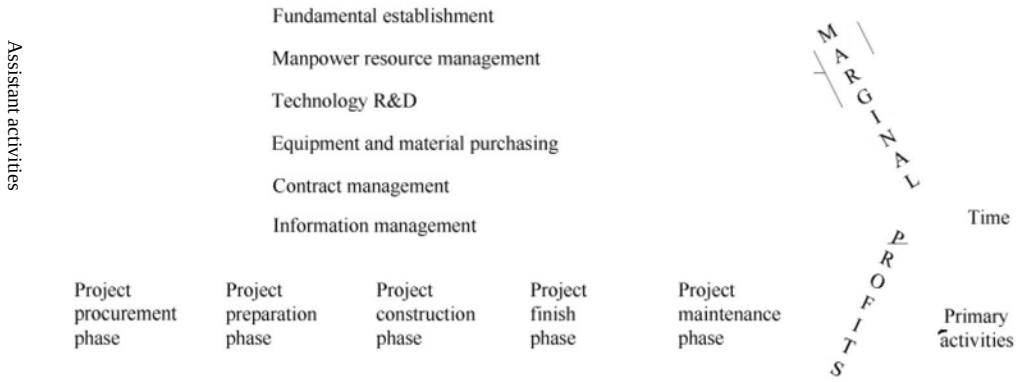

Figure 1: Construction Corporation Internal Value Chain

And each organization contributes to an external value chain or a supply chain, too. All the external value chains make up of a system of value chain network. At the heart of the system lies the owner. All branches of this network collaborate to add value for all the units, especially for the owner in construction industry.

3.5 Organization development

The main goal of BPR is to establish a process-oriented structure in which operating system is established on various processes flowing through the organization. Figure 2 illustrates the organization transformation from traditional to process-oriented.

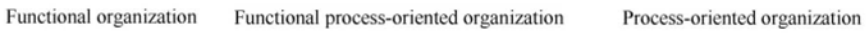

Figure 2: Organization Transformation from Traditional to Process-oriented

A strategic framework to re-organize an organization is given in Figure 3.

Figure 3: Strategic Framework to Re-organize An Organization

In this framework, there are four key things that managers often overlook and underemphasize. They are pointed up as follows.

First is the corporation vision. The vision consists of core ideology and envisioned future which should be proclaimed by the leaders of the organization. It's a fundamental rethinking about what the organization is to become.

Second, it is crucial not just to get senior management's concurrence, but to get them to commit themselves and their best people to the effort to perform BPR.

Third is the cardinal and continuing need to communicate so that everyone in the corporation understands the method and goals of the reengineering effort.

Finally, reengineering is not a one-time trip. It is a never ending journey, because the world keeps changing. Processes that have been reengineered once will someday have to be reengineered all over again. BPR is not a project; it must be a way of life.

4. MODEL OF METHODOLOGY OF CONSTRUCTION CORPORATION'S BPR

Reengineering in Chinese construction corporations is a systematic project. The conductors advocating and promoting BPR in his corporation must get a global, holistic, and total-life-cycle view. Figure 4 puts forward the model of methodology of construction corporation's BPR which may give an all-way guidance.

Figure 4: Model of BPR Methodology

A notable character of the reengineered construction corporation is the application of information technology, which integrates the whole value chain. The new value chain takes advantage of a new information platform, which is called Information Portal (IP). And inside the contractors, Management Information System (MIS) plays the same role of IP—the information processor.

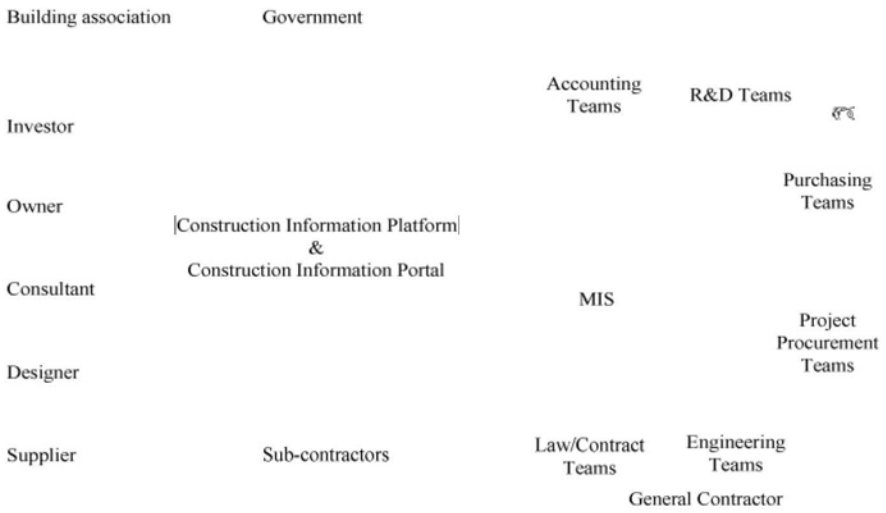

Figure 5: Reengineered Construction Corporation

5. A CASE OF BPR'S APPLICATION ─ REDESIGN OF CONSTRUCTION PROJECT PROCUREMENT PROCESS

According to the theory of value chain, construction project procurement process is a series of primary value adding activities. And it is the first and cardinal process. So it is a key process of a construction corporation.

5.1 Methodology of redesign

The focus of redesign is to eliminate non-value processes and to adjust key processes. Here are three principles to guide construction project procurement process redesign:

- Make the fuzzy processes clear. Standardize and systemize the processes which are prone to susceptible to artificial factors and the processes which are used to be dealt with according to people's experiences.
- Make the complicated processes simple. Eliminate the unnecessary and non-value activities to increase efficiency.
- Make ordinal processes parallel to eliminate the bugs, mistakes and errors generated in the confused state of boundary spanning activities and internal conflicts between different departments that have muddled lines of responsibility and accountability.

A method called ESIA is recommended. ESIA is short for an assembly of four words—eliminate, simply, integrate and automate. It means eliminating non-value activities, simplifying essential activities, integrating simple activities, and automating work-flows.

5.2 Analysis of Current Construction Project Procurement Process

The People's Republic of China Contract Law, which was put into force on October 1st, 1999 and *The People's Republic of China Bidding/Tendering Law*, which was put into force on January 1st, 2000, symbolize the establishment of a new bidding system in Chinese construction industry. And the promulgation of *The Code of Valuation with Bill of Quantities of Construction Works* has ameliorated the project bidding condition. In this bidding system, construction corporations should give their

quoted price independently. Then the winner to contract the project will be picked according to the reasonable low price principle. Theoretically, construction project procurement process is a typically static game of incomplete information for contractors. To win this game, construction corporations should design new procurement processes fit for this bidding system. However, the antique and demoded procurement processes based on rating valuation in Chinese construction corporations couldn't meet the need to win in the new bidding system.

Look at Figure 6. It is an example of current procurement processes which are based on rating valuation.

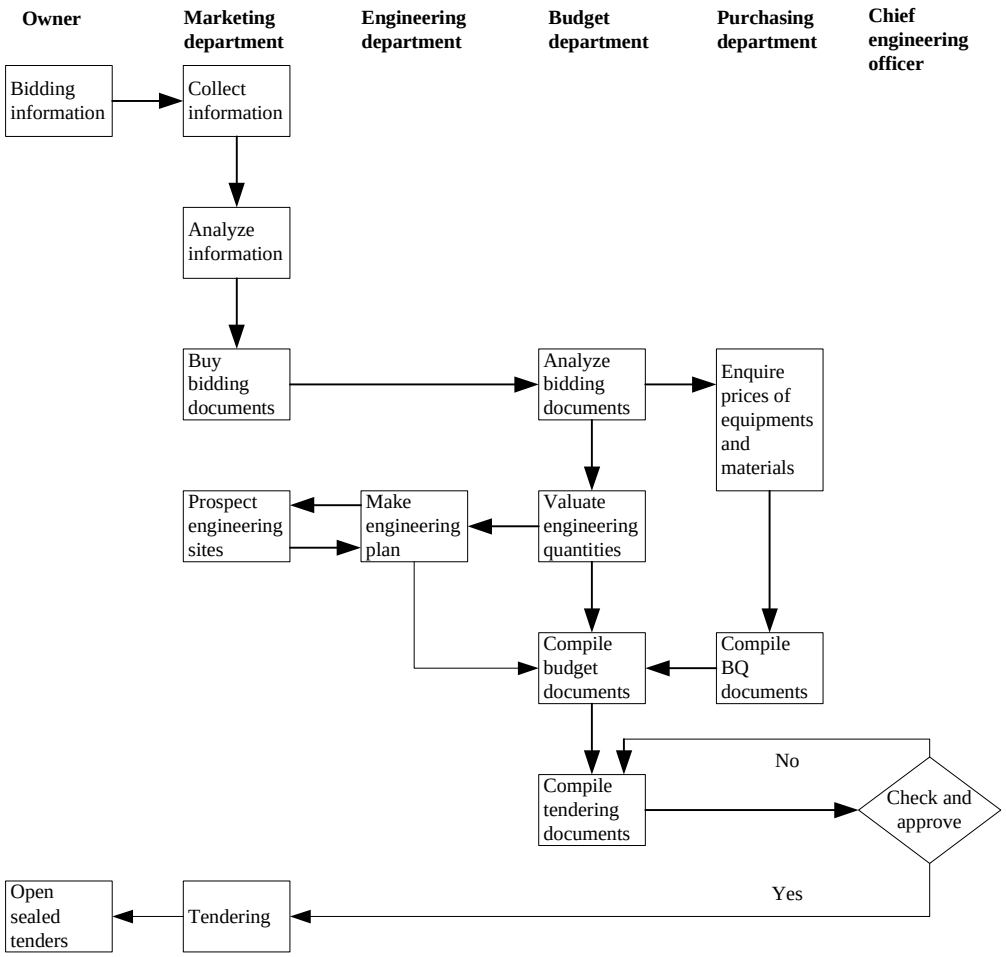

Figure 6: Construction Project Procurement Process Based on Rating

In Figure 6, there are four departments and one senior officer of the construction corporation participating in the process. At first, the marketing department contacts with the owner, collects bidding information and transfers it to the budget department. The budget department analyzes the bidding documents and valuates the quantities of construction works. Then the engineering department makes and amends engineering plan according to prospect statistics offered by the marketing department. Then the purchasing department enquires prices of the materials and equipments needed in the new project. At last the budget department makes tendering documents and sends them to the chief engineering officer who takes charge of this process. That officer also harmonizes all the activities, especially the boundary spanning activities between different departments, to make all these departments collaborate and cooperate.

The process described above is remarkably conventional. Since there is a long route of information transfer, it's prone to clumsy, sluggish, inefficient, and noncompetitive. This case is also a good example of the 80-20 rule, technically known as the law of maldistribution, which was formulated by an early twentieth-century Italian economist called Pareto who stated that 80 percent of the effort expended in a process is caused by only 20 percent of the input.

5.3 Construction Project Procurement Process Base on BQ

The most basic and common feature of reengineered processes is the absence of an assembly line; that is, many formerly distinct jobs and tasks are integrated and compressed into one. A process team answers for the entire construction project procurement process. This team consists of marketing professionals, accountants, engineers, management consultants and a process leader who serves as a coach, not a supervisor. In this team, contribution and performance are the primary bases for compensation. Performance is measured by the value created and compensation should be set accordingly.

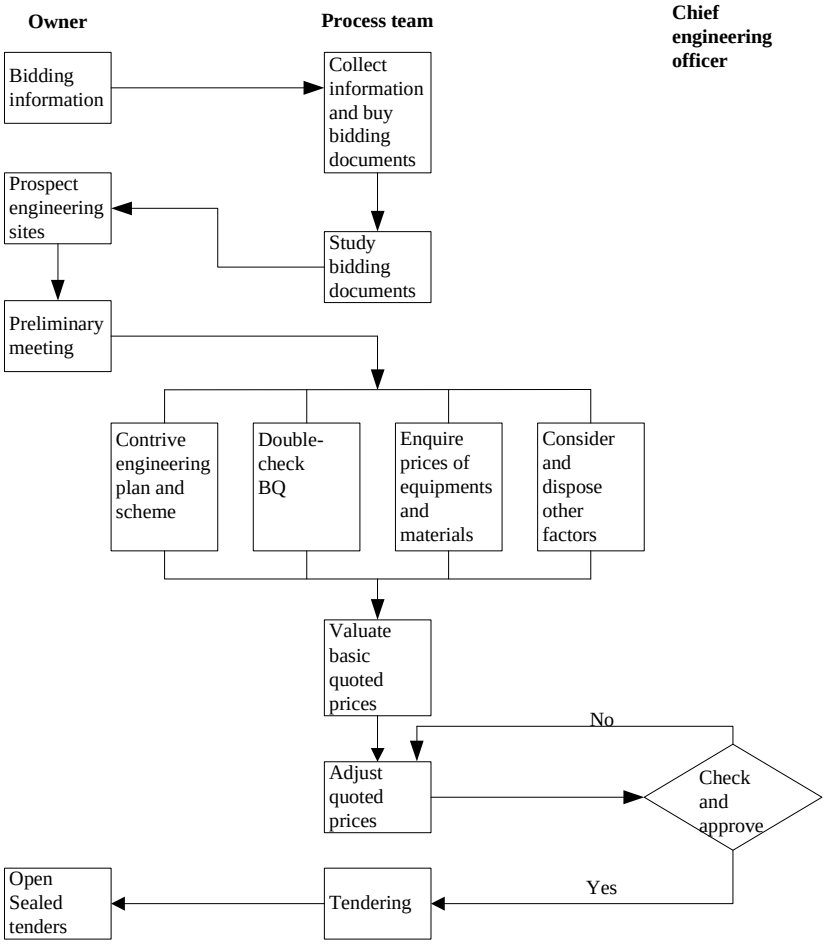

Figure7: Construction Project Procurement Process Based on BQ

Look at Figure 7. In this new process, process team members, who are collectively responsible for process results rather than individually responsible for tasks, have a different kind of job. They share joint responsibility with their team members for performing the whole procurement process, not just a small piece of it. Each team member will have at least a basic familiarity with all the steps in the process and is likely to perform several of them. For example, a marketing professional may have some engineering skills, and an engineer may have some budget skills. Moreover, everything an individual does is imbued with an appreciation for the construction project procurement process as a whole.

6. CONCLUSIONS

In conclusion, it's essential and crucial to reengineer for construction corporations after the promulgation of T*he Code of Valuation with Bill of Quantities of Construction Work***s** which represents a breakthrough of the transformation and reform in China construction industry. To succeed in BPR which is about beginning again with a clean sheet of paper, managers in Chinese construction industry should reengineer and develop the structures of their corporations and redesign the business processes, especially key processes.

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